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Forest Insect Investigations

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EFFECT OF HIGHWAY SLASH ON WESTERN PINE BEETLE INFESTATION

The Bureau of Entomology of the United States Department of Agriculture has recently completed a four-year investigation of the effect of slash from highway clearing on insect infestation of surrounding timber. The work was conducted by J.E. Patterson, Assistant Entomologist, on a highway in the Cascade Mountains of southern Oregon.

It has been known that slash in all sections of the country is usually infested by one or more species of two groups of forest insects commonly known as barkbeetles and borers. Until recently, however, little has been done to make a scientific analysis of the relation between such infestations and infestations in surrounding timber.

The Bureau of Entomology began its study in 1920 with the clearing of a highway through a large timber area, consisting of yellow pine, sugar pine, Douglas fir, white fir, and true fir. The slash consisted of entire trunks and tops of trees dragged to either side of a clearing 60 feet wide and 24 miles long. In this region the western pine beetle is the principal insect enemy of the mature western yellow pine.

To investigate the relationship of the slash to the attack and breeding of barkbeetles, one square foot of bark was taken from the middle of the butt cant of each felled tree after the emergence of the broods, and entrance and exit holes counted. These data were then compared with data from standing trees which had been attacked by barkbeetles.

The conclusions were as follows:

Line slash of the character here considered is very attractive to the barkbeetle Dendroctonus brevicomis, practically all such slash being attacked by this insect.

The attack of this barkbeetle on the slash is not so heavy as its attack on mature standing timber. In the particular attack studied approximately one-half as many beetles attacked a unit area of bark on the felled trees as attacked an equal area on standing timber.

The broods developing in slash are characterized by abnormal mortality. The increase of beetles developing in the slash studied was only 64 per cent of the number of beetles making the attack, whereas the corresponding increase in adjacent standing timber at the same time was 135 per cent.

Barkbeetles from the surrounding standing timber are attracted to the slash at the time of attack, and a temporary concentration of infestation occurs in its immediate vicinity. Normal distribution of the infestation is resumed within a year.

The concentration just mentioned and the breeding of beetles in line slash do not increase or greatly influence infestations in the surrounding forests. The cycle of an infestation continues regardless of the slash.

This study indicates that the infestation of line slash by Dendroctonus brevicomis is not a serious menace to neighboring mature timber, and may be disregarded when the problem of slash disposal is under consideration.

--PUBLIC ROADS for February, 1927.

WESTERN PINE BEETLE EXPERIMENTS
UNDER WAY ON THE SIERRA

Mr. Person left for Northfork on April 4 to follow up a line of studies similar to those initiated last season. His assistants this season will be Albert Wagner, George Struble and Donald DeLeon. Buckhorn was temporarily assigned to the work during April.

The first phase of the work this spring consisted in setting up five cages, which will be used for testing out the susceptibility of selected trees to barkbeetle attack. Infested bark was collected from a large series of trees and brought into the experimental area. The beetles emerging from this bark will be trapped and used in starting attack in the cages.

A recruise of the Northfork burn will also be a part of the work to be carried out during May.

Snow and bad roads delayed the work during the early part of April, and for awhile it appeared that emergence of the beetles would be considerably later than usual. However, warm weather during the latter part of April speeded up development of the broods, and by May 1 beetles were starting to emerge.

H.L.P.

AN UNDESIRABLE IMMIGRANT

Many of our worst insect pests come to us from foreign countries. The gipsy, browntail and satin moths are a few forest insects of this class. Recently there has come to California a Philippine insect which may cause considerable damage to stored hardwood timber. This is the mahogany beetle, Xylothrips flavipes Ill., which is a powder post beetle belonging to the family Bostrichidae. Sections of red Philippine mahogany (tanguile)--Shorea polysperma Merr., and white Philippine mahogany (white lanan)--Pentacme contorta Merr. & Rolfe, sent in from Los Angeles, are badly riddled by the large circular larval mines of this species. Whether the pest will live in our climate and will attack our native hardwoods is not known. Usually, however, powder post beetles have little regard for botanical or geographical boundaries.

H.E.B.

BIG HOLE BASIN CONTROL PROJECT HELD UP BY SNOW

Because of thirty inches of snow on the area where it was intended to start control operations early in April, the Big Hole control work will have to be postponed until May. Climatic conditions are at least one month later than in 1926. Because of this delayed start the administration of the project will be made much more difficult, as the maximum strength of the organization will have to be built up much faster than was planned. It is hoped that climatic conditions will delay the activities of the insect as well as those of the project, so that the two will balance. In that case the work can continue well into July and the estimated number of trees will be treated. J.C.E.

COLOR CHANGES OF FOLIAGE OF YELLOW PINE
INFESTED BY THE WESTERN PINE BEETLE

It is of direct value in estimating the extent of barkbeetle infestations to know what percentage of infested trees exhibit any given color phase at a certain period of the year. A study of the changing color phases of western yellow pine infested with the western pine beetle was undertaken a few years ago in southern Oregon. A number of infested trees were examined monthly from the time of attack until the black-top stage was reached. Some of these trees were attacked in July, some in August, and the remainder in September. The largest part of the broods overwintered in the trees, making possible the securing of records which are of the greatest value for use in control work. From the data furnished by this study, tables have been prepared showing the percentage of trees in each color phase for each month following attack. The table which is here given refers to trees containing overwintering broods of beetles, and shows the percentage of infested trees in each color phase for each of the months following attack.

Monthly phase percentage of total number trees examined

Month	Attack	Green	Fading	Sorrel	Red	Black
July	4%	100%				
August	30	100				
September	66	88	12%			
October		78	18	4%		
November		57	22	15	6%	
December		38	28	18	16	
January		38	18	18	26	
February		36	20	18	26	
March		36	18	18	28	
April		26	23	11	40	
May		18	20	18	42	2%
June			20	18	55	7
July			9	18	53	20
August			4	13	63	20
September				15	65	20
October				4	76	20
November					80	20
December					80	20
January					73	27
February					73	27
March					18	82
April						100

J.E.P.

MAINTENANCE CONTROL PROVES SUCCESSFUL
IN IDAHO WHITE PINE

Mr. Evenden's final report on the Independence Creek Experimental Control Project was received during the month. This covers the history and final results of a project which was initiated in 1919 with the purpose of testing out a plan of maintenance control work against the mountain pine beetle in western white pine.

The area selected for the experiment was located on the Cocur d'Alene National Forest and consisted of 3500 acres, containing $8\frac{1}{2}$ million board feet of white pine. This area was isolated from other bodies of white pine in the region, this being considered an important requirement, in order that the effects of control work would not be upset by beetles coming in from outside areas.

Prior to the control work, a record was kept of losses from 1918 to 1923. During this period, which included both an increasing and a declining phase of the infestation, losses averaged 51,453 board feet annually, or .6 of one per cent of the stand. During the seasons of 1924, 1925 and 1926 control work was carried on, and at the end of this period the annual loss was reduced to 5,835 board feet. This figure was less than one-fourth of that recorded during the lowest season, and only one-tenth of the average for the preceding five-year period.

The outstanding results of the project are summarized by Mr. Evenden as follows:

1. As a result of the 1924 and 1925 control operations, 78,091 b.f. of white pine timber was saved.
2. The cost of saving this timber amounted to \$5.12 per M.B.F. for the two years.
3. The average value of white pine stumpage on the Cocur d'Alene National Forest being approximately \$8.50, there would be a margin of \$3.38 over the cost of salvage.
4. The average cost of maintenance control used in reducing an endemic or normal infestation of the mountain pine beetle in white pine would be approximately 5 cents per acre.
5. An area with an infestation as light as 6 to 7 M.B.F. per section would seem to justify maintenance control.

Maintenance control against the western pine beetle was tried out on the San Joaquin Project on the Sierra National Forest with less satisfactory results. Endemic infestations of D.brevicomis have a stubborn tendency to resist artificial control measures, and the commercial values of yellow pine in many regions are not high enough to warrant the cost of intensive protective work.

J.M.M.

POMBING THE BUGS

During the past ten years, airplane dusting to control injurious tree defoliators has been developing slowly. Apparently there are two serious drawbacks to the planes we now have; they are expensive and they are dangerous. Is there another way out? During the war we heard a great deal about the effective artillery barrages laid down at any desired point. Why can we not use small mortars and lay down an arsenical dust or some other poisonous barrage over any desired forested area?

H.E.B.

AMBROSIA BEETLES DAMAGE CEDAR POLES

A recent examination of western red cedar (Thuja plicata) poles in a yard at Coeur d'Alene, Idaho, indicates that a number are injured by the work of a shot-hole borer or ambrosia beetle, probably Trypodendron cavifrons (Mann). The sapwood is riddled by the blackened tunnels of the beetle, which resemble small shot holes. Seldom does the work extend into the heartwood. Poles cut from live trees and peeled soon afterward did not appear to be attacked. All of those found infested showed signs of having died before they were cut; many had evidently been injured by fire. Beside the ambrosia beetle injury some of the poles showed the work of round heads, flat heads and horn-tail borers.

J.C.E.

CONTROL CONFERENCE AT KLAMATH AGENCY

On April 28 a conference was held at the Klamath Indian Agency to discuss plans for conducting control work on the highly epidemic areas of western-pine-beetle-infested yellow pine on the reservation.

There were present Superintendent L.D. Arnold, Forester J.H. Howarth, Forest Examiner William Zeh, Junior Forester Whitney of the Indian Field Service and Assistant Entomologist J.E. Patterson of the Bureau of Entomology.

It was decided to request a \$25,000 fund for a two-year campaign. The first control work will be done on the Torrent Spring area, which adjoins a Long-Bell area treated by the Long-Bell people during the past year.

THE MEASURING WORM (NEPYTIA NIGROVENARIA PACK.) AN ENEMY OF THE MONTEREY PINE

At Pacific Grove in February, 1924, the writer found the caterpillars of this species doing considerable damage to the foliage of young trees; medium-sized, full-grown and prepupal larvae and pupae were found. The prepupal larvae and the pupae were found on the tips of the twigs in nests made of the young needles tied together with a moderately tight web. From four larvae which pupated February 24, 26, 29, moths emerged March 18, 20 and 24.

H.E.B.

SOLAR HEAT AGAIN

How many things there are before our eyes that we do not see! The solar heat method of control appears to have come before our eyes a number of times before Dr. Craighead really perceived it. Mr. Patterson mentions some of these instances in his article in the February number of our NEWS LETTER. An earlier account is that of Mr. J.L. Webb in the Yearbook of the Department of Agriculture for 1910. On page 356, in treating of the Hickory Twig-Girdler, Mr. Webb says: "It has been found that in the infested branches which do not fall the larvae seldom complete their development to the adult stage unless the branches are in a shaded position. Likewise, few adults are produced from branches which are freely exposed to the sun after falling."

H.E.B.

ANOTHER DRY SEASON FOLLOWED BY IPS OUTBREAKS

The widespread top-killing of yellow pine over the Sierra and other forests during 1924 was considered to be one of the effects of the long drought of that year. This trouble subsided in 1925, but evidence of considerable killing by Ips appeared again at the close of the 1926 season. The most conspicuous outbreaks I have seen were noticed in the Mariposa District of the Sierra. Through the lower yellow pine belt groups of 50 to 100 trees and more were prevalent. In the pole stands the entire tree is killed, and larger trees are killed down more than 50 per cent of the total height. This outbreak was caused by beetles which attacked late in the summer and fall of 1926 and overwintered. The 1927 spring emergence is now complete, and we shall soon know if the epidemic is to continue into 1927.

J.M.M.

AGES OF INSECT-INFESTED TREES

How old are barkbeetle-infested trees? Four hundred and ninety-one yellow pine trees treated on the Craggy Mountain Project on the Klamath National Forest, Northern California, show the following:

40-100 years old	- -	109 trees
101-140	" - -	102 "
141-180	" - -	91 "
181-220	" - -	68 "
221-260	" - -	44 "
261-300	" - -	23 "
301-340	" - -	26 "
341-500	" - -	28 "

Of the total 491 trees 302 were under 180 years, and 189 over 180 years. Doesn't look as though Dendroctonus brevicornis favored the old trees!

H.E.B.

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